

PLASTIC PALLET

Background of the Invention:

Field of the Invention:

5 The invention relates to an apparatus that can be used as a pallet for storing goods, more specifically, to a plastic mechanical pallet that can be used in a manufacturing, distribution or warehouse facility.

10 Description of the Related Art:

U.S. Patent No. 4,562,718 (Dunk) discloses a pallet formed of sheet metal using a drawing operation. The pallet includes depressions and ribs, which are stamped or drawn into the pallet 15 from the product or load carrying side of the pallet.

U.S Patent No. 4,674,414 (Nülle et al.) discloses a one-piece pallet with a plurality of legs and channel-like webs. The Legs and the webs are formed from the product side of the pallet and 20 are depressions on the product side of the pallet.

U.S Patent No. 3,526,195 (Maryonovich) discloses a plastic pallet formed of a single sheet of thermoplastic material. The pallet has ribs and legs. The legs and the ribs are formed from

the product side of the pallet and are depressions on the product side of the pallet. Depending on a pallet's orientation in relation to another pallet, the pallet is either nestable or stackable with respect to other pallets.

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U.S Patent No. 5,791,262 (Knight et al.) discloses a reinforced plastic pallet that is constructed from two separate plastic sheets, which are pressed together at preselected locations.

10 U.S Patent No. 4,809,618 (Bell) discloses a plastic pallet that is formed of injection molded plastic or injection molded plastic foam. The pallet has a flat upper surface and a plurality of supporting legs. The legs are used for providing rigidity and support. The pallet includes lifting ribs and  
15 strengthening rib on a bottom side of the pallet.

Prior art pallets have the disadvantages that they are not edge rackable (can be supported only by the edges of the pallet when the pallet is loaded) particularly along the longer sides of the  
20 pallet. Furthermore, the prior art does not disclose pallets having only seven feet or legs.

Summary of the Invention:

It is accordingly an object of the invention to provide a single-walled homogeneous plastic pallet which overcomes the above-mentioned disadvantages of the heretofore-known devices and methods of this general type and which provides a durable 5 pallet that is easily manufactured, lightweight, and can be used to hold a variety of products.

With the foregoing and other objects in view there is provided, in accordance with the invention, a pallet including a single 10 wall of homogeneous material defining a substantially flat load-supporting surface. The substantially flat load-supporting surface has perimeter edges. The single wall has an underside opposite the load-supporting surface. Raised ribs formed by an increased material thickness of the wall and which project from 15 the underside and extend between and up to the edges is provided. Deflections in the single wall, which form legs projecting from the underside, are included.

In accordance with another feature of the invention, there are 20 provided raised lips formed by an increased material thickness of the wall and which project from the load-supporting surface at the four edges.

In accordance with a further feature of the invention, the perimeter edges include two opposite substantially parallel longitudinal edges and two other substantially parallel opposite edges. The opposite longitudinal edges are longer than the 5 other two opposite edges.

In accordance with an added feature of the invention, the legs are only seven legs, which include four corner legs, a center leg at a center of the pallet and two side legs at a middle of 10 the longitudinal sides.

In accordance with an additional feature of the invention, the legs are cored out from the load-supporting surface.

15 In accordance with yet another feature of the invention, the legs have holes formed therein for allowing fluid drainage.

In accordance with yet a further feature of the invention, the legs are formed with draft angles  $\alpha$  for producing and stacking 20 the pallets.

In accordance with yet an added feature of the invention, the raised ribs include longitudinal raised ribs extending

substantially parallel to the longitudinal edges and radial raised ribs radiating from a center of the pallet.

In accordance with yet an additional feature of the invention,  
5 there are provided downwardly-extending lips formed by an increased material thickness of the wall and which project from the underside at the four edges. The material thickness of the downwardly-extending lips is less than the material thickness of the raised ribs. The raised ribs have a lead in angle  $\beta$ , which  
10 blends into the downwardly-extending lips.

In accordance with still another feature of the invention, the raised ribs include longitudinal raised ribs extending substantially parallel to the longitudinal edges and radial raised ribs radiating from a center of the pallet.

In accordance with still a further feature of the invention, the load-supporting surface has a surface texture.

20 With the objects of the invention in view, there is also provided, a pallet including a single wall of homogeneous material defining a substantially flat load-supporting surface. The substantially flat load-supporting surface has perimeter edges. The single wall has an underside opposite the load-

supporting surface. Raised lips formed by an increased material thickness of the wall and which project from the load-supporting surface at the perimeter edges are provided. Downwardly-extending lips formed by an increased material thickness of the 5 wall and which project from the underside at the perimeter edges are provided. Raised ribs formed by an increased material thickness of the wall and which project from the underside and extend between and up to the downwardly-extending lips are also provided. Deflections in the single wall form legs projecting 10 from the underside.

Other features which are considered as characteristic for the invention are set forth in the appended claims.

15 Although the invention is illustrated and described herein as embodied in the plastic pallet, it is nevertheless not intended to be limited to the details shown, since various modifications and structural changes may be made therein without departing from the spirit of the invention and within the scope and range 20 of equivalents of the claims.

The construction and method of operation of the invention, however, together with additional objects and advantages thereof will be best understood from the following description of

specific embodiments when read in connection with the accompanying drawings.

Brief Description of the Drawings:

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Fig. 1 is a perspective view of the pallet according to the invention as seen from the load carrying side;

10 Fig. 2 is a perspective view of the pallet according to Fig. 1 as seen from the underside; and

Fig. 3 is a section through the center of two nested pallets according to Fig. 1.

15 Description of the Preferred Embodiments:

Referring now to the figures of the drawing in detail and first, particularly, to Fig. 1 thereof, there is seen a single-walled plastic pallet 1 according to the invention. The plastic pallet 20 1 is produced by a low-pressure structural foam process, which utilizes a chemical foaming agent to produce a pallet of homogeneous material. The term homogeneous material refers to a blend of plastic resin such as HDPE (High Density Polyethylene), filler such as calcium carbonate, and a blowing agent, and a

color concentrate. It is also possible to include a low percentage of LDPE (Low Density Polyethylene) as a regrind material for lowering material costs. Because the pallet 1 is a single-walled homogenous part it is completely and easily 5 recyclable.

The pallet 1 includes a substantially planar load-supporting surface 5, which can be provided with a surface texture or surface grain 8 for increasing the coefficient of friction 10 between the load and the pallet 1. The pallet 1 has four perimeter edges, which have raised lips 6, which project in the direction of the load to be supported by the pallet. The raised lips 6 help prevent the load from shifting off of the pallet 1. The four edges of the pallet also have downwardly-extending lips 15 11, which extend in a direction away from the load to be supported by the pallet.

The pallet 1 includes seven legs for supporting the pallet 1 on the floor or on top of the load of another pallet 1. The legs 20 include four L-shaped corner legs 4, two side legs 2, located in the center of the long sides of the pallet 1, and a center leg 3 located in the center of the pallet 1. The legs are cored out from the load carrying side of the pallet 1, so as to reduce the weight of the pallet 1 and to reduce the cycle time for

producing the pallet 1. The legs are provided with generous radii at all their edges, and the legs may have holes 7 in their bottoms to allow drainage of any liquid that the pallet 1 may be exposed to. The legs can include a draft angle  $\alpha$  on their sides 5 to allow the easy manufacture of the pallet 1 and to allow a plurality of pallets 1 to be nested upon one another.

Fig. 2 shows ribs, which are provided only on the underside of the pallet 1. The ribs include longitudinal ribs 10 which are 10 substantially parallel to the long side of the pallet 1 and run the entire length of the pallet 1 from edge to edge and thus from downwardly-extending lip 11 to downwardly-extending lip 11. The ribs also include radial ribs 9, which extend from the center leg 3 of the pallet 1 to the downwardly-extending lips 15 11. The radial ribs 9 and the longitudinal ribs 10 intersect one another. Both the longitudinal ribs 10 and the radial ribs 9 may be interrupted by any one of the legs, however, the ribs 20 continue on the opposite side of the legs to the downwardly-extending lips 11. At the edges of the pallet 1 each of the ribs have a lead in angle  $\beta$ , which blends into the downwardly-extending lips 11. The angle  $\beta$  allows forks of a forklift to enter a region under the pallet 1 without damaging the ribs 9, 10.

Fig. 3 shows the pallet in an edge rackable position, where edge rackable is defined as supporting a pallet 1 from its underside by only supporting the pallet 1 under two opposing edges of the pallet. Such a support may be a pair of angle irons 17 mounted 5 on a frame. The pallet 1 must have sufficient rigidity to be edge rackable. In the present invention the downwardly-extending lips 11 and the ribs 9, 10, which extend up to the downwardly-extending lips 11, achieve this rigidity. The lead in angle  $\beta$  of the ribs matches the angle of an angle iron on 10 which the pallet 1 is edge rackable. Although the ribs 9, 10 have been disclosed as radial ribs 9 and longitudinal ribs 10, any geometry of ribs can be used as long as sufficient strength is provided for edge racking of the pallet 1.

15 Fig. 3 also shows two pallets 1 as they are nested when stacked on top of one another. As can be seen from Fig. 3 the legs fit into the recesses of the legs 2, 3, 4 of the underlying pallet 1. Furthermore when nested, the top pallet 1 rests on its ribs 9, 10 on the load-supporting surface 5 of the underlying pallet. 20 The lead in angle  $\beta$  formed on the ribs 9, 10 allows access to separate the pallets 1 when they are nested.